

WHAT IS CLAIMED IS:

1. A packet control system comprising:
  - a packet forwarder that transfers a packet received from a network interface to another network interface; and
  - 5 a packet control device that routes the packet using a routing process, wherein
    - the packet forwarder includes
      - a received packet transfer unit that transmits to the packet control device a routing information packet received from the
      - 10 network interface, and
      - the packet control device includes
        - a virtual interface that has address information associated with the network interface of the packet forwarder;
        - a transmitted packet reception unit that receives the
        - 15 routing information packet, that associates the routing information packet with the virtual interface, and that delivers the routing information packet to the routing process; and
        - a transmitted packet transfer unit that receives the routing information packet sent by the routing process, and that
        - 20 transmits the routing information packet to the packet forwarder.
  - 2. A packet control device which constructs a routing table for a packet forwarder controlled by the packet control device, using a routing process running on the packet control device, the packet control
  - 25 device comprising:

a virtual interface that has address information associated with the network interface of the packet forwarder;

a transmitted packet reception unit that receives the routing information packet transmitted from the packet forwarder, that  
5 associates the routing information packet with the virtual interface corresponding to an incoming network interface of the packet forwarder, and that transmits the routing information packet to the routing process; and

a transmitted packet transfer unit that receives the routing  
10 information packet sent by the routing process, and that transmits the routing information packet to the packet forwarder.

3. The packet control device according to claim 2, further comprising:

15 a routing table transfer unit that acquires a routing table updated by the routing process, and that transmits the routing table to the packet forwarder.

4. A packet control device which constructs a routing table for a  
20 packet forwarder controlled by the packet control device which determines an outgoing network interface of the packet received at an incoming network interface of the packet forwarder, the packet control device comprising:

a plurality of network interfaces; and  
25 a plurality of virtual interfaces each having address information

that is associated with one of the network interfaces of the packet forwarder, the network interfaces of the packet control device and the virtual interfaces being divided into a plurality of groups, wherein  
the packet control device routes the packet using a routing  
5 process associated with each of the groups considering interfaces  
belongs to the groups to create a dedicated routing table for each, the  
each of the groups corresponds to a separate device.

5. The packet control device according to claim 4, wherein  
10 the virtual interfaces are grouped for each packet forwarder, and  
the packet control device maintains routing tables using a  
routing process associated with each of the virtual interfaces grouped.

6. A packet forwarder which forwards a packet from its network  
15 interface to its other network interface according to its routing table,  
comprising a received packet transfer unit that transmits a routing  
information packet received at the network interface to a packet control  
device that maintains the routing table of the packet forwarder using a  
routing process.

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7. The packet forwarder according to claim 6, further comprising a  
routing table setting unit that receives a routing table from the packet  
control device, and that sets the routing table to the packet forwarder.

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8. A method of maintaining a routing table using a routing process, the method comprising:
- receiving a routing information packet which is received by a packet forwarder;
  - 5 associating the routing information packet with a virtual interface that has address information associated with a network interface of the packet forwarder;
  - delivering the routing information packet to the routing process;
  - receiving the routing information packet sent by the routing
  - 10 process; and
  - transmitting the routing information packet to the packet forwarder for transmitting from its network interface.
9. The method according to claim 8, further comprising:
- 15 acquiring a routing table updated by the routing process; and
  - transmitting the routing table to the packet forwarder.
10. A method of maintaining a routing table in a system that includes a packet forwarder and a packet control device, the packet
- 20 forwarder including a plurality of network interfaces, the packet control device including a plurality of network interface and a plurality of virtual interfaces each having address information that is associated with one of the network interfaces of the packet forwarder, the method comprising:
  - 25 dividing the network interfaces of the packet control device and

the virtual interfaces into a plurality of groups; and

maintaining a routing table of each of the group using a routing process associated with each of the groups.

5 11. The method according to claim 10, wherein the virtual interfaces are grouped for each packet forwarder, further comprising maintaining a routing table of each packet forwarder using a routing process associated with each of the virtual interfaces grouped.

10 12. A method of maintaining a routing table of a packet forwarder, the method comprising:  
receiving a routing information packet from a network interface of a packet forwarder; and  
transferring the routing information packet to a packet control  
15 device.

13. The method according to claim 12, further comprising:  
receiving a routing table from a packet control device; and  
setting the routing table to the packet forwarder.

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14. A computer program product for routing a packet using a routing process, including computer executable instructions stored on a computer readable medium, wherein the instructions, when executed by the computer, cause the computer to perform:

25 receiving a routing information packet from a network interface

of a packet forwarder;

transmitting the routing information packet to a packet control device;

receiving the routing information packet from the packet

5 forwarder;

associating the routing information packet with a virtual interface that has address information associated with the network interface;

transmitting the routing information packet to the routing process;

10 receiving the routing information packet transmitted from the routing process; and

transmitting the routing information packet to the packet forwarder.

15 15. The computer program product according to claim 14, wherein the instructions further cause the computer to perform:

acquiring a routing table updated by the routing process; and transmitting the routing table to the packet forwarder.

20 16. A computer program product for maintaining a routing table, the packet forwarder including a plurality of network interfaces, the packet control device including a plurality of network interfaces and a plurality of virtual interfaces each having address information that is associated with one of the network interfaces of the packet forwarder, the computer  
25 program product including computer executable instructions stored on a

computer readable medium, wherein the instructions, when executed by the computer, cause the computer to perform:

dividing the network interfaces of the packet control device and the virtual interfaces into a plurality of groups; and

5 maintaining a routing table of each of the groups using a routing process associated with each of the groups.

17. The computer program product according to claim 16, wherein the virtual interfaces are grouped for each packet forwarder, and the  
10 instructions further cause the computer to perform maintaining a routing table of each packet forwarder using a routing process associated with each of the virtual interfaces grouped.

18. A computer program product for maintaining a routing table of a  
15 packet forwarder, including computer executable instructions stored on a computer readable medium, wherein the instructions, when executed by the computer, cause the computer to perform:

receiving a routing information packet from a network interface of the packet forwarder; and

20 transferring the routing information packet to the packet control device.

19. The computer program product according to claim 18, wherein the instructions further cause the computer to perform:

25 receiving a routing table from a packet control device; and

setting the routing table to the packet forwarder.

20. A router control device comprising:

5 a virtual interface setting unit that creates and manages virtual interfaces on a router control device according to corresponding network interfaces of a forwarder;

a routing unit that generates a routing table for the forwarder based on routing information in routing information packets received at the network interface of the forwarder and transferred by the forwarder  
10 to the router control device; and

a routing information storage unit that stores a routing table created and managed by the routing unit for packet forwarding between the virtual interfaces.

15 21. The router control device according to claim 20, further comprising a tunnel transfer unit that transfers the routing information packet via a communication path that connects between the network interface and the virtual interface, wherein

the routing information storage unit stores the routing  
20 information in the routing information packet transferred by the tunnel transfer unit, and

the routing unit generates the routing table for the forwarder based on the routing information stored in the routing information storage unit.

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22. The router control device according to claim 20, further comprising:

a routing table transmission unit that acquires the routing table and that transmits the routing table to the forwarder, wherein

5 the routing unit generates the routing table for the forwarder based on the routing information stored in the routing information storage unit.

23. A router control system which includes a forwarder and a router control device, wherein

the router control device includes

a virtual interface setting unit that that creates and manages virtual interfaces on a router control device according to corresponding network interfaces of a forwarder;

15 a tunnel transfer unit that transfers the routing information packet via a communication path that connects between the network interface and the virtual interface;

a routing information storage unit that stores routing information in the routing information packet transferred by the tunnel transfer unit;

20 a routing unit that generates the routing table for the forwarder based on the routing information stored in the routing information storage unit; and

the routing table transmission unit that acquires the routing table, and transmits the routing table to the forwarder, and

the forwarder forwards a packet from its network interface to its other network interface according to its routing table, and includes a received packet transfer unit that transmits a routing information packet received at the network interface to the router control device that

5 maintains the routing table of the forwarder using a routing process.

24. A method of maintaining a routing table, comprising:

creating and managing virtual interfaces on a router control device according to corresponding network interfaces of a forwarder;

10 generating a routing table for the forwarder based on routing information in routing information packets received at the network interface of the forwarder and transferred by the forwarder to the router control device; and

storing a routing table created and managed by the routing unit

15 for packet forwarding between the virtual interfaces.

25. The method according to claim 24, further comprising transferring the routing information packet via a communication path that connects between the network interface and the virtual interface,

20 wherein

the storing includes storing the routing information in the routing information packet transferred by the tunnel transfer unit, and

the generating includes generating the routing table for the forwarder based on the routing information stored.

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26. The method according to claim 24, further comprising:  
acquiring the routing table; and  
transmitting the routing table to the forwarder, wherein  
the generating includes generating the routing table for the  
5 forwarder based on the routing information stored.

27. A method of maintaining a routing table, comprising:  
creating and managing virtual interfaces on a router control  
device according to corresponding network interfaces of a forwarder;  
10 transferring the routing information packet by tunneling via a  
communication path that connects between the network interface and  
the virtual interface;  
storing routing information on the routing information in the  
routing information packet transferred;  
15 generating a routing table for the forwarder based on the routing  
information stored;  
acquiring the routing table;  
transmitting the routing table to the forwarder;  
forwarding a packet from a network interface of the forwarder to  
20 other network interface of the forwarder according to a routing table of  
the forwarder; and  
transmitting a routing information packet received at the network  
interface of the forwarder to the router control device that maintains the  
routing table of the forwarder using a routing process.

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28. A computer program product for maintaining a routing table, including computer executable instructions stored on a computer readable medium, wherein the instructions, when executed by the computer, cause the computer to perform:

- 5           creating and managing virtual interfaces on a router control device according to corresponding network interfaces of a forwarder;           generating a routing table for the forwarder based on routing information in routing information packets received at the network interface of the forwarder and transferred by the forwarder to the router
- 10       control device; and           storing a routing table created and managed by the routing unit for packet forwarding between the virtual interfaces.

29. The computer program product according to claim 28, wherein
- 15       the instructions further cause the computer to perform transferring the routing information packet via a communication path that connects between the network interface and the virtual interface, wherein           the storing includes storing the routing information in the routing information packet transferred by the tunnel transfer unit, and
  - 20       the generating includes generating the routing table for the forwarder based on the routing information stored.

30. The computer program product according to claim 28, wherein the instructions further cause the computer to perform:
- 25       acquiring the routing table; and

transmitting the routing table to the forwarder, wherein  
the generating includes generating the routing table for the  
forwarder based on the routing information stored.

- 5 31. A computer program product for maintaining a routing table,  
including computer executable instructions stored on a computer  
readable medium, wherein the instructions, when executed by the  
computer, cause the computer to perform:
- creating and managing virtual interfaces on a router control
  - 10 device according to corresponding network interfaces of a forwarder;  
transferring the routing information packet by tunneling via a  
communication path that connects between the network interface and  
the virtual interface;
  - storing routing information on the routing information in the
  - 15 routing information packet transferred;
  - generating a routing table for the forwarder based on the routing  
information stored;
  - acquiring the routing table;
  - transmitting the routing table to the forwarder;
  - 20 forwarding a packet from a network interface of the forwarder to  
other network interface of the forwarder according to a routing table of  
the forwarder; and
  - transmitting a routing information packet received at the network  
interface of the forwarder to the router control device that maintains the
  - 25 routing table of the forwarder using a routing process.